

# Journal of Conference Abstracts

Volume 4 Number 1

## Symposium G07 3D Modelling of the Continental Crust

---

## Session G07:4P

G07 : 4P/01 : PO

### 3D Crustal Structure of the Central Iberian Plate from Gravity Data

Rosa Tejero (rosatej@eucmax.sim.ucm.es),

David Gomez Ortiz &

Javier Ruiz

Departamento de Geodinamica, FAC, CC Geologicas, Ciudad, Universitaria, 28040, Madrid, Spain

Intraplate main structural units of the Iberian Plate (Spanish Central System and Tertiary Basins) results from a mid-Tertiary compressive regime, caused by the convergence of African and European Plates. Crustal structure of this zone has been studied by means of spectral analysis of gravity maps. A gravity survey has been carried out and a Gravity map has been produced. Bidimensional spectral analysis of the data allows us to obtain the mean depth of the sources contributing to the total observed field. From the plot of the natural logarithm versus the radial frequency, two major discontinuities are recorded. The deeper one, located to a mean depth of  $28 \pm 5$  km, corresponds to the crust-mantle boundary, in good agreement with seismic data (Suriñach & Vegas, 1988), and the shallower has a mean depth of  $7 \pm 0.4$  km, representing the upper crust-middle crust transition. In order to isolate the regional and residual sources, specific filters has been designed (Gupta & Ramani, 1980). Regional gravity map shows a relative low which expands in a NW-SE direction under the Spanish Central System and surrounding areas of Duero and Tajo Basins. Low and high anomalies distribution in residual gravity map reflects density changes in the upper crust. Two NE-SW trending strong gradients present in this map are related to the reverse faults which bound the northern and southern limits of the Spanish Central System with the Basins. The inversion method applied (Parker, 1972) permits us to obtain the three-dimensional Moho discontinuity, which is consistent with the two-dimensional models for the area (Tejero et al., 1996). The Moho geometry is characterised by a N  $150^\circ$  E trending wide through, transverse to the chain, reaching depths greater than 33 km. This through is located in the middle part of the chain, running to the basins. To the northeastern and southwestern part, the Moho rise to 30 km deep, which is the average depth value of the Iberian Plate crust. This gravity analysis together with seismic data are used to constrain spatial variations in density and crustal structure, which combined with thermal data, allow us to design a vertical strength distribution for the crust. Its thermal structure is derived from surface heat flow observations assuming heat production and thermal conductivity values for sediments, upper crust, lower crust and lithospheric mantle. The strength profiles show that ductile-brittle transition occurs between 10 and 15 km. Deepest earthquakes reach depths not far from 15 km, which is in good agreement with these results.

Gupta & Ramani, *Geophysics*, **45(9)**, 1412-1426, (1980).

Parker, *J. R. astr. Soc.*, **31**, 447-455, (1972).

Suriñach & Vegas, *Phys. Earth Planet. Inter.*, **51**, 226-234, (1988).

Tejero, Perucha, Rivas and Bergamin, *Geogaceta*, **20(4)**, 947-950, (1996).